IMCSM Proceedings

ISSN 2620-0597

Volume XX, Issue (1), (2024)

An international serial publication for theory and practice of Management Science

Editor-in-Chief: Prof. dr Marija Panić

Published by University of Belgrade, Technical Faculty in Bor, Department of Engineering Management

Bor, May 2024

Scientific Board (SB) of the Conference:

Živan Živković, University of Belgrade, Technical faculty in Bor, **honorary president of SC.**
Marija Panić, University of Belgrade, Technical Faculty in Bor, **president of the SB**.
Predrag Đorđević, University of Belgrade, Technical Faculty in Bor, **vice-president of the SB**.
Aćimović, S., University of Belgrade, Faculty of Economics, Belgrade, Serbia;
Bazen, J., Saxion University of Applied Sciences in Enschede, The Netherlands;
Beh, L.S., University of Malaya, Faculty of Economics and Administration, Kuala Lumpur, Malaysia;
Carrassi, M., University of Bari Aldo Moro, Bari, Italy;
Chelishvili, A., Business and Technology University, Tbilisi, Georgia;
Duysters, G., Eindhoven University of Technology, Eindhoven, The Netherlands;
Filipović, J., University in Belgrade, Faculty of Organizational Science, Belgrade, Serbia;
Gao, S., Edinburgh Napier University, Edinburgh, United Kingdom;
Grošelj, P., University of Ljubljana, Biotechnical faculty, Ljubljana, Slovenia;
Gupte, J., Goa Institute of Management, Poriem, Sattari, Goa, India;
Halis, M., Bolu Abant Izzet Baysal University, Faculty of Communications, Bolu, Turkey;
Huth, M., Fulda University of Applied Sciences, Fulda, Germany;
Kangas, Y., University of Eastern Finland, Joensuu, Kuopio, Eastern Finland, Finland;
Kume, V., University of Tirana, Faculty of Economics, Albania;
Michelberger, P., Obuda University, Budapest, Hungray;
Mitić, P., Institute of Economic Science, Belgrade, Serbia,
Mumford, M. D., University of Oklahoma, Norman, Oklahoma, USA;
Mura, L., University of Ss. Cyril and Methodius, Trnava, Slovakia;
Nikolić, Đ., University of Belgrade, Technical Faculty in Bor, Serbia;
Nordal, A., Municipal Undertaking for Educational Buildings and Property, Oslo, Norway;
Pang, J., Shanxi University, School of Computer and Information Technology, Taiyuan, Shanxi, China;
Parnell, J. A., University of North Carolina Pembroke, School of Business, Pembroke, USA;
Pavlov, D., "Angel Kanchev" University of Ruse, Bulgaria;
Prasad, R., Banaras Hindu University, Institute of Management Studies, India;
Radosavljević, S., Kolubara coal basin, Lazarevac, Serbia;
Radulescu, M., University of Pitiesti, Faculty of Economics, Pitiesti, Romania;
Remeikiene, R., Mykolas Romeris University, Vilinius, Lithuania;
Spasojević Brkić, V., University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia;
Stefanović, D., University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia;
Stevic, Ž., University of East Sarajevo, Faculty of Transport and Traffic Engineering, Doboj, Bosnia and Herzegovina;
Szarucki, M., Cracow University of Economics, Cracow, Poland;
Ingram, T., University of Economics in Katowice, Katowice, Poland;
Usman, B., University of Bengkulu, Faculty of Economics and Business, Bengkulu, Indonesia;
Virglerová, Z., Tomas Bata University in Zlín, Center for Applied Economic Research, Zlin, Czech Republic;
Zwikael, O., The Australian National University, Research School of Management, Canberra, Australia;

Organizing Board of the Conference:

Fedajev, A., president of the Organizational Board;
Panić, M., vice-president of the Organizational Board;
Voza, D., vice-president of the Organizational Board;
Veličković, M., member of the Organizational Board;
Arsić, S., member of the Organizational Board;
Gajić, M., member of the Organizational Board;
Jevtić, A., member of the Organizational Board;
Radić, A., member of the Organizational Board;
Vasković, S., member of the Organizational Board.

Editorial board:

Marija Panić, Editor in Chief;
Aleksandra Fedajev, Co-Editor;
Danijela Voza, Co-Editor;
Milica Veličković, Technical Editor;
Sanela Arsić, Technical Editor;
Sandra Vasković, Technical Co-Editor;
Adrijana Jevtić, Technical Co-Editor;
Aleksandra Radić, Technical Co-Editor.

Reviewers:

Živan Živković, University of Belgrade, Technical faculty in Bor;
Marija Panić, University of Belgrade, Technical Faculty in Bor;
Predrag Đorđević, University of Belgrade, Technical Faculty in Bor;
Aćimović, S., University of Belgrade, Faculty of Economics, Belgrade, Serbia;
Bazen, J., Saxion University of Applied Sciences in Enschede, The Netherlands;
Beh, L.S., University of Malaya, Faculty of Economics and Administration, Kuala Lumpur, Malaysia;
Carrassi, M., University of Bari Aldo Moro, Bari, Italy;
Chelishvili, A., Business and Technology University, Tbilisi, Georgia;
Duysters, G., Eindhoven University of Technology, Eindhoven, The Netherlands;
Filipović, J., University in Belgrade, Faculty of Organizational Science, Belgrade, Serbia;
Gao, S., Edinburgh Napier University, Edinburgh, United Kingdom;
Grošelj, P., University of Ljubljana, Biotechnical faculty, Ljubljana, Slovenia;
Gupte, J., Goa Institute of Management, Poriem, Sattari, Goa, India;
Halis, M., Bolu Abant Izzet Baysal University, Faculty of Communications, Bolu, Turkey;
Huth, M., Fulda University of Applied Sciences, Fulda, Germany;
Kangas, Y., University of Eastern Finland, Joensuu, Kuopio, Eastern Finland, Finland;
Kume, V., University of Tirana, Faculty of Economics, Albania;
Michelberger, P., Obuda University, Budapest, Hungray;
Mitić, P., Institute of Economic Science, Belgrade, Serbia,
Mumford, M. D., University of Oklahoma, Norman, Oklahoma, USA;
Mura, L., University of Ss. Cyril and Methodius, Trnava, Slovakia;

Scientific Council:

In front of the publisher: Prof. dr Dejan Tanikić*, Dean of Technical Faculty in Bor
*dtanikic@tfbor.bg.ac.rs
Editor-in-Chief: Prof. dr Marija Panić**, Technical Faculty in Bor
**mpanic@tfbor.bg.ac.rs

The International May Conference on Strategic Management (IMCSM24) was held in a hybrid format (in person and online) on May 31, 2024, at Bor Lake, Serbia.

E-Book of Proceedings available at: https://mksm.tfbor.bg.ac.rs/

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

005.51(082)(0.034.2)

INTERNATIONAL May Conference on Strategic Management (20 ; 2024 ; Bor)
[XX] International May Conference on Strategic Management – IMCSM24, May 31, 2024, Bor [Elektronski izvor] / [editor in chief Marija Panić]. - Bor : University of Belgrade, Technical Faculty, Engineering Management Department, 2024 (Bor : Tercija). - 1 USB fleš memorija ; 1 x 2 x 6 cm. - (IMCSM Proceedings, ISSN 2620-0597 ; vol. 20, issue (1) (2024))

Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - Tiraž 100. - Bibliografija uz svaki rad.

ISBN 978-86-6305-150-8

a) Стратешки менаџмент -- Зборници

COBISS.SR-ID 145959177

Conference is financially supported by the Ministry of Science, Technological development and Innovation of the Republic of Serbia

Konferencija je finansijski podržana od strane Ministarstva nauke, tehnološkog razvoja i inovacija Republike Srbije

Gold Donor

The special section of IMCSM24 will be organized within the framework of the project SmartMiner, on a topic "**Support Systems for Smart, Ergonomic and Sustainable Mining Machinery Workplaces**". This project is funded by the Science Fund of the Republic of Serbia as a part of the Green program of cooperation between science and industry (Grant No. 5151).

INTERNATIONAL MAY CONFERENCE ON STRATEGIC MANAGEMENT

SADRŽAJ

Plenary section

Smart miner section

IMCSM2024

Volume XX, Issue (1) (2024) 232-241

International May Conference on Strategic Management

DOI: *10.5937/IMCSM24023R* *Original research*

DEVELOPMENT AND VALIDATION OF MEASUREMENT INSTRUMENT FOR GREEN KNOWLEDGE MANAGEMENT

Aleksandra Radić*, Ivan Jovanović, Nenad Milijić

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Green knowledge management represents a new direction of knowledge management in organizations. As an intensively represented concept, it has awakened the interest of many researchers to examine the cause-and-effect relationships of this concept and related variables. To analyze this concept more deeply using statistical analysis methods, it is necessary to develop an instrument that will be used for measurement and analysis. In this regard, this paper describes the process of developing and validating a measurement scale for comprehensive research on green knowledge management, green technology and innovation, organizational performances, and management commitment to the ecology. Thanks to the analysis results that show that the proposed questionnaire for measuring the mentioned variables is a valid and reliable measurement scale, it can be said that the main motive of the work is fulfilled and that the result of this research has a significant contribution to the growing body of literature.

Keywords: Green knowledge management, questionnaire development, validation and reliability of the measurement scale, statistical analysis

1. INTRODUCTION

In recent decades, organizations have been paying more and more attention to what effects their operations can have on the environment. This issue is becoming a dominant topic in the minds of many managers and employees, as well as other stakeholders. Due to numerous hazardous consequences, which primarily relate to the environment, the concept of knowledge management has acquired a new dimension. One of the most recognizable trends in the field of sustainable business is a greater understanding of environmental problems.

In order for the company to have a balanced approach to the consumer and environmental perspective, the company's employees must have adequate green knowledge (Shehzad et al., 2020). The difference between successful and unsuccessful organizations is precisely knowledge, with special reference to adequate management (Revilla et al., 2016). In this regard, the creation of new products, services, and processes aligned with the needs of sustainable development and environmental requirements represents imperatives of modern

* *Corresponding author: aradic@tfbor.bg.ac.rs*

Aleksandra Radić, ORCID: 0000-0003-4253-8004
Ivan Jovanović, ORCID: 0000-0002-3713-5203
Nenad Milijić, ORCID: 0000-0001-8741-3892

business. For this reason, a new, upgraded concept called green knowledge management - GKM is emerging. The GKM concept differentiates between environmentally sustainable and unsustainable companies (Khan et al., 2024), directing the company to the path of success, survival, and development.

There is a growing body of academic research investigating the relationship between green knowledge management and organizational performance, sustainability, and innovation. Thus, by analyzing the Scopus database, it can be determined that the number of works on this topic is increasing significantly (Radić et al., 2023). In order to examine the attitudes of employees in organizations related to the newly created GKM concept, there was a need to create a new comprehensive questionnaire.

The motive of this work is the development and validation of a measuring instrument that connects GKM, green technologies and innovations (GTI), management commitment to ecology (MCEE), and organizational performance (OP). The potential contribution of the results of this study is reflected in the validation of a new measurement instrument that can be used for the comprehensive measurement of GKM and related areas.

This paper is divided into several units. After the introductory part, there follows the second part, which refers to the literature review with the presentation of the theoretical background of the problem. In the third part, the research methodology is presented with the research steps described in detail. The following sections refer to the research results and discussion, as well as the conclusion, respectively.

2. LITERATURE REVIEW

The concept of GKM is of great importance for the operations of organizations by the requirements for sustainable principles. It strives for the integration of ecological aspects in the process of organizational learning and the introduction of sustainability principles into the dimensions of the previous classic concept of knowledge management (Aboelmaged & Hashem, 2019). This is the proactive paradigm necessary to manage organizational success in a competitive market. For the company to succeed in its efforts to adapt to the new environmental requirements of the environment, the company must find channels through which it can collect the necessary knowledge (Arfi et al., 2018), and then store it (Pepple et al., 2022) and use it, i.e. share (Song et al., 2020). In this connection, it is possible to talk about three related dimensions of green knowledge management, namely green acquisition, green storage, and green sharing.

Green products and green processes must be based on knowledge, so green knowledge is closely related to GTI. GTI can be defined as products, services, and processes that do not harm the environment or reduce its degradation (Ahmed et al., 2023). According to Ciu et al. (2021), GTI represents a corporate strategy that is implemented at the level of the organization, but in such a way that it contributes to the aspirations for the recovery of the environment at the global level. Xie et al. (2019) state that this approach to combining green products and processes leads to the creation of a strategic advantage that is difficult to imitate. Considering this fact, in this paper green products and green processes are presented as a single variable.

On the other hand, one of the most important priorities of any organization is its performance. According to Arfa et al. (2018) performance effects can be measurable (profit, ratios, etc.) and immeasurable (reputation, contribution to environmental protection, green brand, etc.). For this reason, in the concept of GKM, organizational performance can combine environmental performances and economic performances. Based on the above, in this paper, the economic and environmental indicators of the business operations of the investigated organizations are observed under organizational performance.

Also, if the leaders of the organization are not aware of the importance of GKM and the contribution that GTI has to OP, the organization cannot implement these practices. Numerous studies have confirmed that it is the management of the company that should be approached as a direction in creating a green organizational culture (Wang, 2019). This is how a new important determinant of GKM is being developed, which is MCEE. Whether the employees will share the same values depends on the management's increase in ecological and sustainable practices. In other words, when upper-level management shows concern for environmental issues, employees will follow suit (Wei et al., 2023).

Based on the review of the relevant literature, it can be concluded that there is a close connection between the mentioned areas of GKM, GTI, OP, and MCEE. In this regard, this paper starts from the observed research gap, which can be explained as the need for the development and validation of a comprehensive measurement scale composed of a set of appropriate questions that can be used to measure the mentioned variables.

3. RESEARCH METODOLOGY

The questionnaire development and validation process involves several stages as shown in Figure 1.

The primary phase was related to the review of relevant literature, through which the basic dimensions of GKM, GTI, OP, and MCEE were identified. In this research, questions from other questionnaires that were validated during previous research were combined, which is a very common practice in the academic community.

After the literature review, pilot testing was performed, which involved testing the initial version of the questionnaire on a sample of 33 respondents. In addition, a check on the clarity and comprehensibility of the questions was made in the discussion with focus groups made up of managers and experts from this field. Also, bearing in mind that the research is being conducted on the territory of Serbia, the translation of the questionnaire from foreign literature and harmonization with the meanings of the Serbian language was done with the consultation of experts. The final version of the questionnaire was used for data collection.

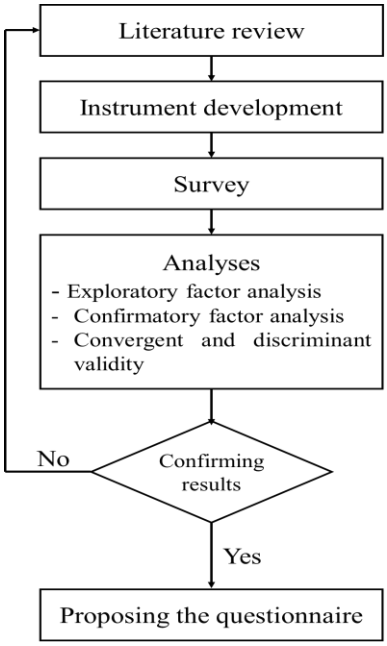

Figure 1. Process of questionnaire development and validation

To take a thorough approach to this analysis, and to make the findings accurate and reliable, exploratory and confirmatory factor analysis, as well as convergent and discriminant validity, were performed. Statistical analysis was performed using SPSS v.18 and AMOS v.26 software packages

4. RESULTS AND DISCUSSION

4.1. Descriptive statistics

The survey included 538 respondents employed in 21 project-based organizations. 66% of men and 34% of women participated in the research. Among the respondents, almost a third of them (32.7%) belong to the age group between 36 and 45 years. The research included respondents with 6 to 10 years of work experience (28.1%). The dominant structure consists of respondents with primary education (71.4%), while 12.8% of respondents have secondary and 14.5% with higher education. The least number of respondents had completed basic academic studies (1.3%), and there were no respondents with a master's or PhD degree.

Table 1. Respondents' demographic data

Variables	Category	N	Percentage (%)
Gender	Male	355	66.0
	Female	183	34.0
Age	Less than 25 years	42	7.8
	26 – 35 years	140	26.0
	36 – 45 years	176	32.7
	46 – 55 years	137	25.5
	More than 56 years	43	8.0
Work experience	Less than 5 years	146	27.1
	6 – 10 years	151	28.1
	11 – 20 years	127	23.6
	21 – 30 years	60	11.2
	Above 31 years	54	10.0
Educational level	Elementary school	384	71.4
	High school	69	12.8
	Higher education	78	14.5
	University	7	1.3
	MSc/PhD	0	0.0
Job position	Manager	45	8.4
	Workers	493	91.6
Company size	Less than 10 employees	28	5.2
	11 – 50 employees	168	31.2
	51 – 250 employees	341	63.4
	Above 251 employees	1	0.2
Company's existence	Less than 6 years	446	82.9
	6 – 10 years	32	5.9
	11 – 20 years	60	11.2
	21 – 30 years	0	0.0
	Above 31 years	0	0.0
Company ownership structure	Domestic ownership	85	15.8
	Foreign ownership	362	67.3
	Mixed ownership	91	16.9

In the research, there were 8.4% of respondents in the position of managers (shift managers, lower and middle management), and 91.6% of employees who are directly involved in the business process. According to the size, the survey covers mostly medium-sized organizations (51-250 employees), as much as 63.4%, and organizations that have been in business for less than 6 years (82.9%). Regarding the company ownership structure, 15.8% of companies are domestically owned, 67.3% are foreign-owned, and 16.9% are mixed.

The complete results of descriptive statistics are shown in Table 1, which offers a clear and detailed picture of the data. By reviewing these statistics, we can better understand the trends and patterns that emerge from the data.

4.2. Exploratory factor analysis

To understand the basic relationship between research and composite variables, exploratory factor analysis (EFA) was conducted. For this analysis, the varimax rotation technique was used in combination with principal component analysis. First, to check the adequacy of the sample using a Kaiser-Meyer-Olkin (KMO) test and Bartlett test of sphericity. In this study, the KMO coefficient is 0.945 (the recommended minimum value is 0.6 according to the authors of Hair et al., 2010), which indicates the suitability of the data for factor analysis. Furthermore, the Bartlett test of sphericity indicates significance (χ^2=13,806; p≤0.001), recommended value p≤0.05, according to the authors Hair et al. (2010). This indicates that there are correlations among the items within the measurement instrument.

According to the EFA results, four factors were extracted that explain 68.90% of the variance of the proposed model, which is by the minimum proposed value of 0.50% (Molina et al., 2007). The coefficients are grouped according to the basic components of the questionnaire (composite variables). This was expected because the items were taken from previously validated and verified questionnaires (see references in Table 2) and adapted to the needs of this research. In the analysis, all items that load one factor 0.4 or above (see Table 2) were retained, based on the recommendation of the author Churchill (1979). Therefore, the results established the unidimensionality of the variables.

Table 2. Measuring instrument and items loading

Code	Items	Factor Loading			
		1	2	3	4
Green knowledge management Yu et al. (2022)					
GKM_1	The organization regularly receives information about environmentally friendly products and processes/services from external stakeholders (e.g. customers and suppliers)	0.868			
GKM_2	The organization regularly receives information about environmentally friendly products and processes/services from internal stakeholders (e.g. management and staff)	0.840			
GKM_3	The organization regularly organizes trainings for employees to develop their knowledge about environmentally friendly products and processes/services	0.831			
GKM_4	The organization has a well-developed information system through which employees can get the necessary information	0.811			
GKM_5	The organization encourages and supports employees to acquire knowledge about environmentally friendly products and processes/services	0.631			
GKM_6	The organization has sufficient information on environmentally friendly products and processes/services	0.951			

GKM_7	The organization has an excellent information system for managing information related to environmentally friendly products and processes/services	0.827			
GKM_8	Information about a specific problem is easily available through our information system	0.815			
GKM_9	We have comprehensive information about our competitors and the environmental impact of their operations	0.748			
GKM_10	Even if someone leaves the organization, our information system retains their knowledge	0.685			
GKM_11	Employees in our organization regularly communicate with each other in order to exchange knowledge and discuss further directions for the development of environmental protection	0.787			
GKM_12	The organization has a well-organized system through which knowledge can be shared and mutual learning can be affirmative	0.776			
GKM_13	The organization has provided the latest equipment and technology for the acquisition and exchange of knowledge	0.762			
GKM_14	The organization recognizes and rewards employees who share innovative ideas and information to improve environmental protection processes	0.733			
GKM_15	The organization regularly shares the latest environmental knowledge and market trends with its employees through e-mails, trainings and workshops.	0.729			
Green technology and innovation Huang & Li (2017)					
Has your organization ever taken the following measures when designing products or processes/services?					
GTI_1	Used environmentally friendly materials (eg less polluting or non-polluting/less toxic or non-toxic materials)		0.882		
GTI_2	Improved and designed environmentally friendly packaging (e.g. less consumption of paper and plastic material) for existing and new products		0.865		
GTI_3	Recycling, reuse and processing of materials at the end of the product's life		0.863		
GTI_4	Used eco-labeling		0.843		
GTI_5	Used lower consumption of energy sources such as water, electricity, gas and gasoline during production/use/disposal		0.838		
GTI_6	Used cleaner technology to save and prevent pollution		0.804		
GTI_7	Reduction or complete elimination of toxicity in the production process		0.774		
Organizational performance Huang & Li (2017); Sahoo et al. (2023)					
Has your organization performed better compared to your main competitors in the following areas?					
OP_1	Operational efficiency			0.887	
OP_2	Sales growth			0.876	
OP_3	Market share growth			0.765	
OP_4	Reductions in consumption of hazardous/harmful/toxic materials			0.741	
OP_5	Profit growth			0.789	
OP_6	Improvements in the environmental situation of the company			0.623	
OP_7	Cash flow			0.654	
OP_8	Reputations in the market			0.684	
OP_9	Market share growth			0.878	
Management commitment to the ecological environment Sahoo et al. (2023)					
MCEE_1	In our organization, there are enough ways to gather green knowledge				0.848

MCEE_2	I have the necessary training in green knowledge management				0.811
MCEE_3	I always get enough knowledge to do my job smoothly				0.798
MCEE_4	Verbal instructions about green knowledge are regularly given to workers				0.765
MCEE_5	My supervisor has the necessary knowledge to overcome environmental risks in business				0.764
MCEE_6	My supervisor always ensures that environmental protection rules and procedures are followed				0.725

Cronbach's alpha test was used to check the internal consistency of the measuring instrument. Composite reliability (Cronbach's alpha) is shown in Table 3.

Table 3. Composite reliability and convergent validity

Construct	Items	Cronbach's alpha	Factor Loading	AVE
GKM	15	0.893	0.631–0.951	0.624
GTI	7	0.929	0.774–0.882	0.704
OP	9	0.858	0.561–0.797	0.596
MCEE	6	0.874	0.725–0.848	0.618

Upon examining the Cronbach alpha test, it is clear that all of the values surpass the recommended minimum of 0.70 (Cronbach, 1951). This indicates that the composite variables have a high level of internal consistency and reliability, and can be used in further analyses.

4.3. Confirmatory factor analysis

Confirmatory factor analysis (CFA) was used to examine the convergent and discriminant validity of the measuring instrument. Convergent validity is assessed by the factor loading of the items, the minimum value of which should be above 0.5 according to Hair et al. (2010). The average variance extracted (AVE) test assesses discriminant validity.

Also, based on the recommendation of Molina et al., 2007, the AVE of all constructs should be above 0.5. As all values are above the recommended value of 0.5 (see Table 3), it can be concluded that the convergent and discriminant validity of the measuring instrument has been achieved. The results presented in Table 3 can be explained as follows. The composite variable GKM contains 15-factor loadings from 0.631 to 0.951. This factor explained 62.40% of the variance with 0.893 Cronbach's alpha value. Analogous to this explanation, the values for the other composite variables (GTI, OP, and MCEE) can also be clarified. Also, CFA allows assessment of the fit of the measurement model, which was done using the AMOS v.26 software package. To determine how well the model fits the data, CFA offers several different statistical tests. Some of them are shown in Table 4.

Table 4. Fit indices

Particulars	χ^2/df	GFI	NFI	AGFI	CFI	SRMR	RMSEA
This model	2.95	0.92	0.90	0.87	0.88	0.78	0.09
Recommended values	≤3[a]	≥0.9[b]	≥0.9[b]	≥0.9[b]	≥0.9[b]	≤0.8[b]	≤0.08-0.10[b]

Notes A: χ^2/df : Chi-square to degree of freedom; GFI: Goodness of fit index; NFI: Normative fit index; AGFI: Adjusted goodness of fit index; CFI: Comparative fit index; SRMR: Standardized root mean residual; RMSEA: Root mean square error of approximation
Notes B: [a]Bagozzi and Yi (1988); [b]Hair et al. (2010)

Based on the CFA results, it is concluded that most of the fit indices are within the recommended values. However, there are some deviations. There is a small deviation in the indicators AGFI (0.87) and CFI (0.88), which can be considered acceptable. In general, it can

be concluded that the model-fit indices have satisfactory values, and it can be considered that the studied model has an acceptable level of fit.

The correlation coefficients of the composite variables are shown in Table 5.

Table 5. Correlation coefficients of composite variables

	GKM	GTI	OP	MCEE
GKM	1			
GTI	0.631	1		
OP	0.679	0.913	1	
MCEE	0.713	0.826	0.838	1

Also, it can be concluded that the correlation coefficients of the composite variables are above the recommended values of 0.3.

Based on the thorough tests and analyses conducted, it can be confidently stated that the proposed measuring scale meets the standard criteria for the instrument. With its accuracy and precision, this measuring scale is sure to provide reliable results for any application.

5. CONCLUSION

Green knowledge signifies a new concept and a new chapter in the discipline of knowledge management. This kind of knowledge is significantly different from the classic concept of knowledge in the organization and is gaining more and more importance in modern business conditions.

This work aimed to develop and validate a comprehensive questionnaire that connects GKM, GTI, OP, and MCEE. Based on the review of the literature, it was observed that these are frequently represented components in various researches in the field of green knowledge.

Bearing in mind the results of the validation of the measuring scale, i.e. the results of EFA and CFA statistics, values were obtained that are within the recommended limits, and it can be concluded that the proposed questionnaire presented in this study represents a reliable and verified measuring instrument.

The implications of this work are reflected in the possibility of applying this measuring instrument, as well as the application of other methods and techniques for further research. Bearing in mind that scientists, academics, and practitioners are very interested in the field of green knowledge, it is expected that the result of this work will produce further research in this field.

The developed and proposed measuring instrument provides a basis for further research and development of various structural models.

ACKNOWLEDGMENT

The research presented in this paper was carried out with the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia within the framework of financing scientific research work at the University of Belgrade, Technical Faculty in Bor, in accordance with the contract with registration number 451-03-65/2024-03/200131.

REFERENCES

Aboelmaged, M., & Hashem, G. (2019). Absorptive capacity and green innovation adoption in SMEs: The mediating effects of sustainable organisational capabilities. *Journal of cleaner production*, 220, 853-863. https://doi.org/10.1016/j.jclepro.2019.02.150

Ahmed, R. R., Akbar, W., Aijaz, M., Channar, Z. A., Ahmed, F., & Parmar, V. (2023). The role of green innovation on environmental and organizational performance: Moderation of human resource practices and management commitment. *Heliyon*, e12679. https://doi.org/10.1016/j.heliyon.2022.e12679

Arfi, W. B., Hikkerova, L., & Sahut, J. M. (2018). External knowledge sources, green innovation and performance. *Technological Forecasting and Social Change*, 129, 210-220. https://doi.org/10.1016/j.techfore.2017.09.017

Bagozzi, R. R., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 074–094.

Churchill, G. A. (1979). A paradigm for developing better measures for marketing constructs. Journal of Marketing Research, 16, 64–73.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.

Cui, R., Wang, J., Xue, Y., & Liang, H. (2021). Interorganizational learning, green knowledge integration capability and green innovation. *European Journal of Innovation Management*, 24(4), 1292-1314. https://doi.org/10.1108/EJIM-11-2019-0325

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). Multivariate data analysis (7th ed.). Pearson.

Huang, J. W., & Li, Y. H. (2017). Green innovation and performance: The view of organizational capability and social reciprocity. *Journal of Business Ethics*, 145, 309-324. https://doi.org/10.1007/s10551-015-2903-y

Khan, A. N., Mehmood, K., & Kwan, H. K. (2024). Green knowledge management: A key driver of green technology innovation and sustainable performance in the construction organizations. *Journal of Innovation & Knowledge*, 9(1), 100455. https://doi.org/10.1016/j.jik.2023.100455

Molina, L. M., Llorens-Montes, J., & Ruiz-Moreno, A. (2007). Relationship between quality management practices and knowledge transfer. *Journal of Operations Management*, 25(3), 682–701. https://doi.org/10.1016/j.jom.2006.04.007

Pepple, D., Makama, C., & Okeke, J. P. (2022). Knowledge management practices: A public sector perspective. Journal of Business Research, 153, 509-516. https://doi.org/10.1016/j.jbusres.2022.08.041

Radić, A., Jovanović, I., & Milijić, N. (2023). Green knowledge management-literature review and overview of contemporary structural models. In *Proceedings of the International May Conference on Strategic Management (IMCSM), Bor, Serbia* (pp. 385-393).

Revilla, E., Rodriguez-Prado, B., & Cui, Z. (2016). A knowledge-based framework of innovation strategy: The differential effect of knowledge sources. *IEEE Transactions on Engineering Management*, 63(4), 362-376. https://doi.org/10.1109/TEM.2016.2586300

Rubel, M. R. B., Kee, D. M. H., & Rimi, N. N. (2021). The influence of green HRM practices on green service behaviors: the mediating effect of green knowledge sharing. *Employee*

Relations: The International Journal, 43(5), 996-1015. https://doi.org/10.1108/ER-04-2020-0163

Sahoo, S., Kumar, A., & Upadhyay, A. (2023). How do green knowledge management and green technology innovation impact corporate environmental performance? Understanding the role of green knowledge acquisition. *Business Strategy and the Environment*, 32(1), 551-569. https://doi.org/10.1002/bse.3160

Shehzad, M., Qu, Y., Zafar, A. U., Rehman, S. U., & Islam, T. (2020). Exploring the influence of knowledge management process on corporate sustainable performance through green innovation. *Journal of Knowledge Management*, 24(9), 2079-2106. https://doi.org/10.1108/JKM-11-2019-0624

Song, M., Yang, M. X., Zeng, K. J., & Feng, W. (2020). Green knowledge sharing, stakeholder pressure, absorptive capacity, and green innovation: Evidence from Chinese manufacturing firms. *Business Strategy and the Environment*, 29(3), 1517-1531. https://doi.org/10.1002/bse.2450

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert systems with applications*, 39(10), 8899-8908. https://doi.org/10.1016/j.eswa.2012.02.017

Wei, F., Abbas, J., Alarifi, G., Zhang, Z., Adam, N. A., & de Queiroz, M. J. (2023). Role of green intellectual capital and top management commitment in organizational environmental performance and reputation: Moderating role of pro-environmental behavior. *Journal of Cleaner Production*, 405, 136847. https://doi.org/10.1016/j.jclepro.2023.136847

Xie, X., Huo, J., & Zou, H. (2019). Green process innovation, green product innovation, and corporate financial performance: A content analysis method. *Journal of business research*, 101, 697-706. https://doi.org/10.1016/j.jbusres.2019.01.010

Yu, S., Abbas, J., Alvarez-Otero, S., & Cherian, J. (2022). Green knowledge management: Scale development and validation. *Journal of Innovation & Knowledge*, 7(4), 100244. https://doi.org/10.1016/j.jik.2022.100244